Stephen Brookes and Susan Older
Full abstraction for strongly fair communicating processes
`http://www.elsevier.nl/locate/entcs/volume1/brookes`

We present a denotational semantics for a language of parallel communicating processes based on Hoare's CSP and Milner's CCS, and we prove that the semantics is fully abstract with respect to a deadlock-sensitive notion of fair behavior. The model incorporates the assumption of strong fairness: every process which is enabled infinitely often makes progress infinitely often. The combination of fairness and deadlock causes problems because the "enabledness" of a process may depend on the status of o ther processes. We formulate a parameterized notion of strong fairness, generalizing the traditional notion of strong fairness in a way that facilitates compositional analysis. We then provide a denotational semantics which uses a form of trace, augmented with information about enabledness, and is related to the failures model for CSP and to Hennessy's acceptance trees. By introducing closure conditions on trace sets, we achieve full abstraction: two processes have the same meaning if and only if they exhibit identical behaviors in all contexts.

J.R.B. Cockett and D.A. Spooner
Categories for synchrony and asynchrony
`http://www.elsevier.nl/locate/entcs/volume1/cockett`

The purpose of this paper is to show how one may construct from a synchronous interaction category, such as **SProc**, a corresponding asynchronous version. Significantly, it is not a simple Kleisli construction, but rather arises due to particular properties of a monad combined with the existence of a certain type of distributive law.

Following earlier work we consider those synchronous interaction categories which arise from model categories through a quotiented span construction: **SProc** arises in this way from labelled transition systems. The quotienting is determined by a cover system which expresses bisimulation. Asynchrony is introduced into a model category by a monad which, in the case of transition systems, adds the ability to idle. To form a process category atop this two further ingredients are required: pullbacks in the Kleisli category, and a cover system to express (weak) bisimulation.

The technical results of the paper provide necessary and sufficient conditions for a Kleisli category to have finite limits. Furthermore, they show how distributive laws can be used to induce cover systems on such Kleisli categories. These provide the ingredients for the construction of asynchronous settings.

Krishna Kishore Dhara and Gary T. Leavens
Weak behavioral subtyping for types with mutable objects
`http://www.elsevier.nl/locate/entcs/volume1/dhara`

This paper studies the question of when one abstract data type (ADT) is a behavioral subtype of another, and proposes a model-theoretic notion of weak behavioral subtyping. Weak behavioral subtyping permits supertype abstraction to be a sound and modular reasoning principle in a language with mutation and limited forms of aliasing. The necessary restrictions on aliasing can be statically checked. Weak behavioral subtyping allows types with mutable objects to be subtypes of types with immutable objects.

Abbas Edalat
Domain theory in learning processes
`http://www.elsevier.nl/locate/entcs/volume1/edalat`

We present applications of domain theory in stochastic learning automata and in neural nets. We show that a basic probabilistic algorithm, the so-called linear reward-penalty scheme, for the binary-state stochastic learning automata can be modelled by the dynamics of an iterated function system on a probabilistic power domain and we compute the expected value of any continuous function in the learning process. We then